Form equations

Notes and guidance

In this small step, children form equations from diagrams and word descriptions.

Begin the step by looking at the difference between an algebraic expression and an equation. An expression, such as $2x + 6$, changes value depending on the value of x, whereas in an equation, such as $2x + 6 = 14$, x has a specific value. You may need to remind children of the algebraic conventions learnt earlier in the block, for example writing $a + a + a$ (or $a \times 3$) as $3a$ and "4 more than b" as $b + 4$

Various representations can be used to support children's understanding, including bar models, part-whole models and cubes and counters with a designated value. It is important that children understand that, for example, the letter c represents the numerical value of the cube rather than the cube itself.

Things to look out for

- Children may look to work out the value rather than represent the information as an equation.
- Children may make errors using algebraic notation, for example confusing $3x$ and $x + 3$

Key questions

- If a is a number, how do you write "3 times the value of a"?
- How do you write "4 more than the number x"?
- If 4 more than the number x is equal to 26, how can you write this as an equation?
- Is an equation the same as or different from a formula?
- What is the difference between an equation and an expression?
- Can you write the equation a different way?
- Is _____ an equation or an expression? How do you know?

Possible sentence stems

- _____ + _____ +_____ = 3 × _____ = _____

- The equation _____ means that the expression _____ is equal to _____

- _____ more/less than _____ is equal to _____ can be written as the equation _____ = _____

National Curriculum links

- Express missing number problems algebraically

Form equations

Key learning

- Tom thinks of a number and calls it x.

  Which expression represents 5 more than Tom's number?

  | $5x$ | $x + 5$ | $x - 5$ | $x \div 5$ |

  Double Tom's number is 64

  Which equation shows this information?

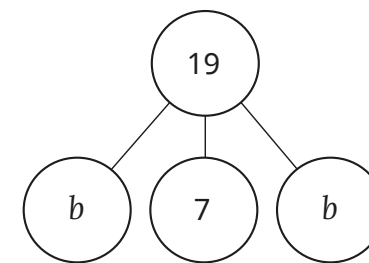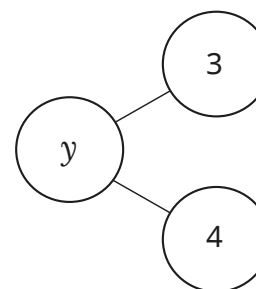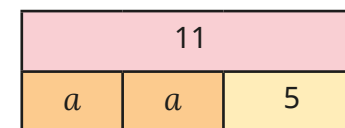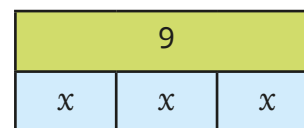 | $x + 2 = 64$ | $x \div 2 = 64$ | $2x = 64$ | $x - 2 = 64$ |

- Max has represented some equations.

  Each linking cube represents y and each base 10 cube represents 1

  $$2y + 3 = 7$$

  What equations are represented?

- Write equations to match the models.

- A book costs £5 and a magazine costs £n.

  The total cost of the book and the magazine is £8

  Write this information as an equation.

- Write algebraic equations for the word problems.

  ▶ I think of a number and subtract 17. My answer is 20

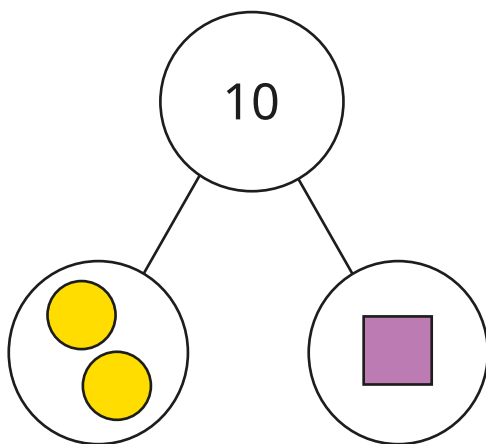 ▶ I think of a number and multiply it by 5. My answer is 45

- Draw bar models to represent the equations.

  | $x + 5 = 11$ | $2y = 15$ | $3a + 9 = 30$ |

Form equations

Reasoning and problem solving

Here is a part-whole model.

10

Write an equation representing the part-whole model.

Each shape has a different integer value.
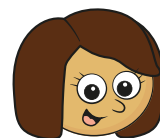
What values might the shapes have?

Using c for circles and s for squares:
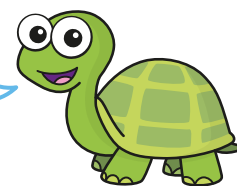
$2c + s = 10$

multiple possible answers, e.g.

$c = 2, s = 6$

Kim is thinking of a number.

If I multiply my number by 3 and then subtract 12, I get the answer 24

I can write that as an equation. $x - 12 \times 3 = 24$

Tiny has not applied the operations in the correct order.

$3x - 12 = 24$

What mistake has Tiny made?

Write the correct equation for Kim's problem.